



GE Fanuc Automation

Programmable Control Products

*Series 90TM-70
Demonstration Case*

User's Manual

GFK-0484A

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Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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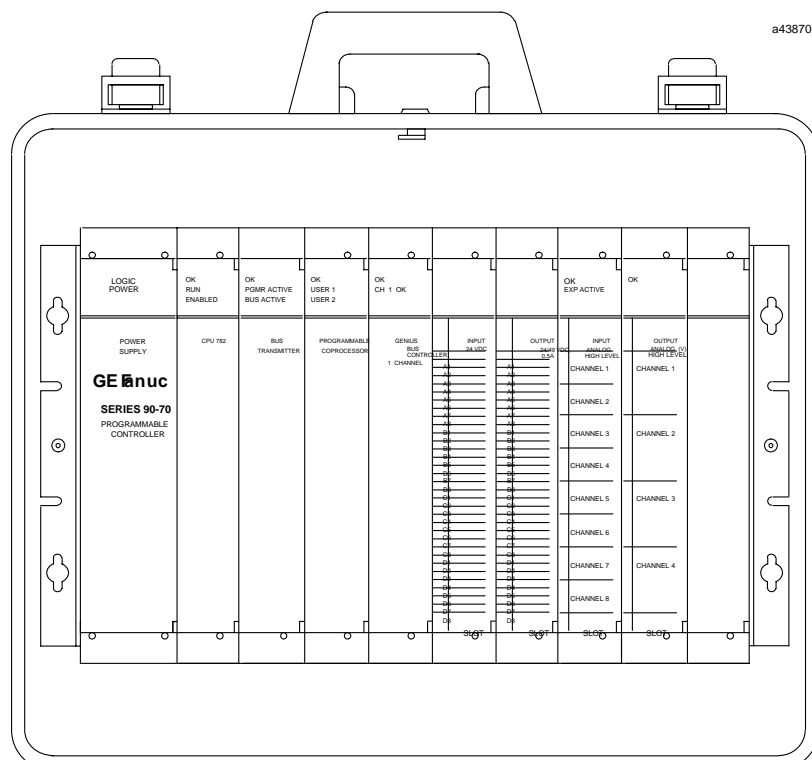
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Chapter 1

Introduction

1.1 Basic Description

The GE Fanuc Series 90™-70 demonstration case is a versatile, portable device that is designed to perform numerous control functions, either as an independent Programmable Logic Controller, or in conjunction with several external simulation or control devices. It is based on the Series 90-70 Programmable Logic Controller, which consists of a rack capable of accommodating up to ten plug in modules, including a wide-range power supply that operates on any voltage from 90V-132V for 115VAC or 185V-264V for 230VAC, and a powerful Central Processing Unit with expandable Random Access Memory. An outline drawing of the case is shown below.



Modules included with the demonstration case allow interfacing to common Input and Output devices, such as thumbwheels, toggle switches, Light Emitting Diodes (LEDs), and a Binary Coded Decimal (BCD) display. Additionally, the case contains several specialized modules which allow operations with more sophisticated control devices.

An extremely versatile module, the Programmable Coprocessor Module (PCM), can be used for data acquisition, data storage and retrieval, and operator interface applications, through the use of a BASIC language interpreter called MegaBasic or C, and one of several user devices, such as barcode readers, displays, serial printers, or personal computers. Furthermore, the PCM can be used for communications to external Programmable Controllers in the Series 90 Family, or any device capable of utilizing the GE Fanuc Series Six™ CCM protocol. Additionally, Analog Input and Output modules are an integral part of the demonstration case, which can be used for simulation or control functions with devices such as temperature, pressure, and flow transducers, or motor drives, hydraulic actuators and signal meters.

Another module, perhaps the most dynamic and multipurpose module in the system, is the Genius™ Bus Controller (GBC) module. The module is used primarily as the central control device of the Genius I/O system, a high speed, serial communications link used for control of a distributed I/O network. This system can also be interfaced to other devices, such as personal or mainframe computers, for data logging, report generation or alternate I/O control applications.

Finally, a Bus Transmitter Module (BTM) is included in the case, which allows expansion to another Series 90-70 rack for additional control and expanded Input and Output functions.

1.2 Modes of Operation

Because of the power built into the demonstration case, it is possible to use the system for much more than product or sales-oriented displays, although these items were central themes in the design of the case. The case can also be used quite effectively for control systems at local Programmable Controller shows, and for system mockups at sales or customer locations. Since the case is a fully functional operating system, it can be used for functional testing and simulation of actual processes at customer sites, and is an invaluable aid in areas of training on both the classroom and self-paced levels.

1.3 Interfacing Options

The demonstration case is capable of operating on its own, as an independent unit, without other devices attached. Although the system does not have “real-world” devices directly attached, it is useful in this stand-alone mode for program development, and basic familiarization and training. In this mode, a programmer or other PC is used as the programming device, along with Logicmaster™ 90-70, to enter and edit programs, and to monitor the operation of the Series 90-70 PLC.

The demonstration case is, however, much more powerful when interfacing to the GE Fanuc Universal Simulator, a system which has all the devices necessary to demonstrate the functionality of the modules in the Series 90-70 demonstration case. These devices include a gas plasma display for connection to the PCM, Analog I/O potentiometers and meter, discrete devices like thumbwheels, toggle switches, Light Emitting Diodes, and a BCD display. An added accessory of the Universal Simulator is a 101-key keyboard, used for configuring, controlling, and developing programs for the PCM in the Series 90-70 demonstration case. Furthermore, all cables for

interfacing the Series 90-70 demonstration case to the Universal Simulator are included with the Series 90-70 demonstration case.

The demonstration case can also be interfaced to a special Genius demonstration case, which contains real-world input and output devices, and Genius I/O Blocks, one for discrete I/O, and one for Analog I/O.

The Series 90-70 demonstration case can also be used in conjunction with the Series 90-30 demonstration case, to demonstrate the commonality of the Series 90 Family of PLCs, particularly in areas like Genius Global Data transfers, and communications, using the PCM, which is common to both PLCs. In the same area of communications, the PCM of either the 90-70 or the 90-30 demonstration case can be interfaced to other GE Fanuc PLCs, like the Series Six, Series Five™, or Series One™, which all use a common communications protocol. The GE Fanuc Operator Interface Unit (OIT) can also be used as an operator interface device, for message display, operator control, or monitoring purposes with the PCM. For simple discrete input and output functions, the Series 90-70 I/O modules can also be wired to a smaller, more compact simulator, called the Series 90-70 I/O Simulator.

In summary, the Series 90-70 demonstration case is a superior, functional demonstration system, which can be interfaced to a wide variety of devices in order to accommodate the needs of the individual in a multitude of situations.

Chapter 2

Unpack/Install

2.1 Packing List

- The package contains a fully assembled and tested Series 90–70 demonstration case with:
 - 9 Slot Rack
 - 55W Power Supply and Power Cord
 - 782 CPU and 512K Memory
 - Bus Transmitter and Parallel Cable***
 - PCM and 512K Memory and RS232 Cable*
 - 1 Channel Genius Bus Controller
 - 24V Input 32 pt Module and Cable**
 - 24V Output 32 pt Module and Cable**
 - Analog Input Module and Cable*
 - Analog Output Module and Cable*
 - Blank Slot
 - * Cable to be used with the Universal Simulator
 - ** Cable to be used with the Universal Simulator or the Series 90–70 I/O Simulator
 - *** Cable to be used with the programmer
- A complete set of Series 90–70 Instruction Manuals and Data Sheets.
- A 3.5 inch backup disk with DEMO70, TEST70 ladder programs and PCM Program and Text files.

2.2 Minimum Requirements

The Series 90–70 demonstration case can be used alone or with almost any combination of other GE Fanuc equipment depending on the interests of the audience.

2.3 Physical Description

The Series 90–70 demonstration case is contained in an aluminum case for easy portability. In the case is a standard rear mount 9 slot rack, populated with the modules listed above. It has been fully tested with the Universal Simulator and comes loaded with the standard ladder and PCM demonstration programs.

2.4 Pre-Installation Setup/Checkout

Check for shipping damage and make sure all the modules are seated in the rack.

2.5 Installation

- Connect the cables to any other equipment to be used, such as the Universal Simulator, Genius demonstration case, and programmer.

The cables to the Universal Simulator are labeled as to which plug they connect to and are of the easy snap on/off variety that do not require a screw driver.

- Remove the keyboard from the lid of the Universal Simulator case and plug it into the keyboard connector.
- Make sure the 115 to 230 selector switch is set to the proper position.
- Connect all equipment to an appropriate power source.

2.6 Power Up/Verification

When power is applied to the Series 90–70, the Logic Power light should come on and the top light on the CPU, PCM, and Bus Controller should flash for a while and then stay on along with the top light of the Bus Transmitter.

The Run and Enabled lights on the CPU should reflect the state of the Run/Stop switch.

The Pgm Active light on the Bus Transmitter should be on when Logicmaster 90 is active on the programmer.

The User 1 light on the PCM should flash when the screen on the Universal Simulator is being updated.

The CH 1 OK light on the Genius Bus Controller should be on.

The lights on the Input and Output modules may or may not be on depending on the state of the simulator switches and the ladder program.

The OK light on the Analog Input and Output modules should be on.

If a Universal Simulator is connected and turned on the screen should show the main menu with 7 possible selections.

If a Genius demonstration case is connected and turned on, and configured according to the instructions in this manual, the Unit OK light on both blocks should be on. If the CPU is in Run mode, the I/O Enabled light should be on for both blocks.

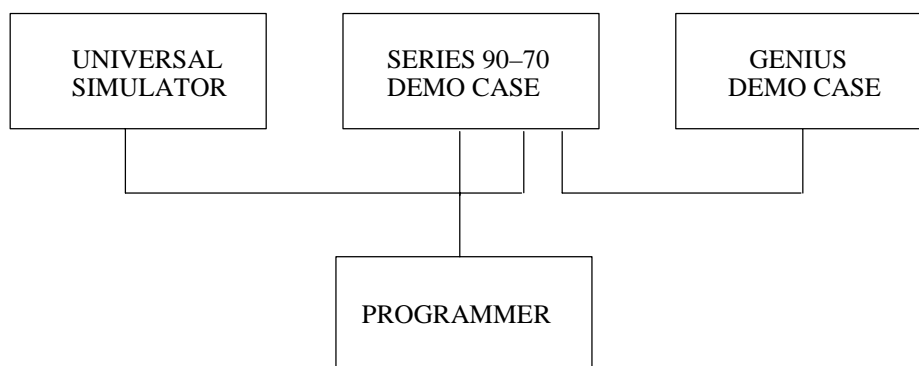
Chapter 3

Setup

3.1 Possible Configurations

There are many possible system configurations possible. The standard demonstration programs assume the following configuration:

(Reserved for High Speed Counter)



Suggested Configuration

The Universal Simulator is used to show the power of the PCM and digital and analog inputs and outputs.

The Genius demonstration case is used to show Genius digital and analog inputs and outputs and Genius diagnostics.

The programmer is used to show Logicmaster 90-70 and the Series 90-70 instruction set.

3.2 Other Possibilities

The programmer screen or a Monochrome OIT could be used in place of the Universal Simulator screen. Using a programmer screen also allows use of an overhead projector for larger audiences using a VGA display device.

A Series 90–70 I/O Simulator could be used in place of the Universal Simulator switches and lights if the audience does not require the screen or analog I/O.

A Series 90–30 demonstration case could be connected to the Genius Bus to show Genius Global Communication. If this is done, some configuration and ladder changes will have to be made in the Series 90–70.

Chapter 4

Operation

4.1 PCM Demonstration

The PCM Demonstration contains a Main Menu with several possible selections. There are two selections, one for the Series 90–30 and one for the Series 90–70, that contain a scrolling window of many of the significant features of each control. These can be used as the basis for many product presentations. There is a screen that lists many of the Logicmaster 90 programming and configuration features. Next there is a set of three application screens showing Manufacturing, Process, and Material Handling. There is a Fault Table screen that shows the I/O Fault Table from Logicmaster 90. Also there is a PCM animation screen that shows the speed of processing and screen update capability of the PCM. Lastly there is a selection to allow the customizing of the feature screens with the audience name.

The PCM Demonstration can be operated without further instructions by just reading the prompts on the screen. But here are some hints that will make things go smoother:

1. The first thing to do to prepare for a demonstration is to go to number 7 on the main menu and enter the audience name. This is not required but it adds a nice touch. You can put in anything you want up to 30 characters. Some samples are:

TO R P COLLINS and STAFF

JOE'S CAR

ACME AND

TO ALL OUR

TO THE PODUNK INDUSTRIAL

Whatever you put in will then show up centered on the upper part of the two features screens. This field is cleared whenever item 7 is selected.

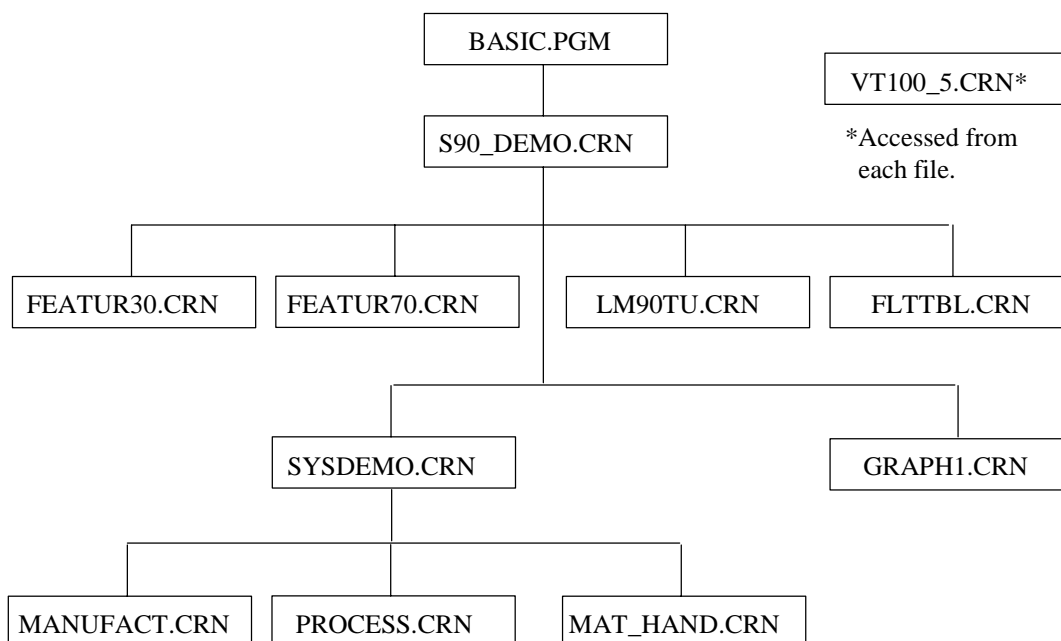
2. Select the Series 90–70 Features screen. Every 5 seconds a new feature scrolls into the scroll window. To pause on a feature, hit the space bar. This allows a discussion of any topic for as long as required. A second hit of the space bar advances to the next feature. The space bar can

also be used to skip a feature that is of little interest. The scrolling feature list will repeat continuously if left undisturbed.

The Escape or Enter keys will always bring you back to the Main Menu.

3. The Logicmaster Features screen is a static screen showing a list of Logicmaster programming and configuration features.
4. The Application Demonstration screen shows a sub menu of sample industry applications. All of these screens show screen animation and screen update speed, PCM to CPU communication and the graphics possibilities of the PCM and MegaBasic. A description of each application follows:
 - A. Manufacturing – Shows a simulated Paint Shop with cars moving along the conveyor, going through one of two paint booths and then through the baking oven. The speed of the cars is controlled by the number in the Universal Simulator thumbwheel switches. The smaller the number, the faster the cars move. Turning on switch 9 on the Universal Simulator simulates a fan failure, shuts the line down, and displays an error message.
 - B. Process – Shows a line of simulated Wine Presses with various valves that can be controlled by switches 1 through 6 on the Universal Simulator. Switch 1 is the master control and must be on in order to get any wine. Then switches 2, 3, 4, and 5 will control the number of presses that receive grapes to be crushed. With switch 1 and a combination of switches 2 – 5 on you will see the wine dribble out the lower pipe.
 - C. Material Handling – Shows a Tank Farm with 8 tanks that you can use to hold your wine. Each tank has an inlet/discharge valve that you can control using switches 1 through 16 on the Universal Simulator. Each valve can be closed, half open, or full open. Each tank has a level indicator and when any tank reaches an overflow condition, an error message is displayed. If any tank is left unattended with its valve open, it will cycle from empty to full and back to empty.
5. The Fault Table screen shows a simulation of the Logicmaster I/O Fault Table. A future project is to update this screen from the CPU.
6. The PCM Animation screen shows 8 bar graphs all being updated in a random manor from 8 independent timed interrupts in the PCM. This screen shows the tremendous speed of the PCM, and its ability to keep screen information current.

7. The structure of the PCM demonstration program is shown below:



4.2 DEMO70 Ladder

The DEMO70 ladder program shows many of the features and capabilities of the Series 90–70 PLC. First, it is an example of structured programming, in that almost all of the logic is contained in Program Blocks. Second, it contains a working sample of each ladder instruction and function block. These samples are grouped in program sub blocks according to their Logicmaster 90 function key groups. Third, the Genius demonstration case can be used not only to show Genius I/O but also Genius Diagnostics. You can force Genius faults and show the results on the Logicmaster I/O Fault Table. And fourth, you can use the programmer and Logicmaster 90–70 to show the programming and configuration software and the on line monitoring of the program and status tables.

The program contains 19 program blocks of which 13 are called from the MANUAL block. These contain the sample instructions.

When the program first starts, the FIRST SCAN contact forces it into Manual mode and the MANUAL program block is activated. Move the cursor to the MANUAL block and zoom into it using F10. Now you can interrogate each of the blocks containing the sample instructions by simply dialing up its number on the Universal Simulator thumbwheel and toggling switch 16. Then zoom into that block using F10. There are 11 blocks numbered as follows:

- 1) RELAY, 2) TMR, 3) CTR, 4) MATH, 5) RELATN,
- 6) BITOP, 7) DATAMV, 8) TABLES, 9) CONVRT, 10) CONTRL, and 11) SYSREFS.

There is one more block (without a number) called SETUP which is used for Manual operations and for housekeeping for the rest of the blocks. It is activated by dialing 0 on the thumbwheel and toggling switch 16. This will connect all 16 switches to the lights. If switch 1 is on and 2 is off the -10 to +10 pot is connected to the meter. If switch 1 is off and 2 is on

the 0 to +10 pot is connected to the meter. If switch 3 is on the -10 to +10 pot is connected to the BCD display.

Once activated as described above, each of the sample instruction blocks can be demonstrated by just reading the logic and turning on the switches called for. The comment at the beginning of each program block contains instructions for demonstrating the logic in that block. Use F10 to zoom into a comment after placing the cursor on that rung. In each block, toggling switch 15 will clear the working %R, %P, and %Q tables so you can start over with a clean slate.

Once you have made it through all the Manual features of the ladder program, you are ready to put it into Auto mode. Momentarily activate the Genius demonstration case limit switch to set the Auto mode. Operating the Genius demonstration case metal detector (input #7) or cycling through Run–Stop–Run with the CPU switch takes the program out of auto mode.

When in the Auto mode, the lights on the Universal Simulator are cleverly bounced around by the LIGHTS program block with the help of the DISPLAY program block. The LOG program block counts the number of times the lights shift back and forth and puts the number on the BCD display. The thumbwheel switch is used to control the speed of the shifting. The smaller the number, the faster the lights will shift.

In any mode the GENIUS program block does the following:

1. The value from Analog input 1 is compared against a high and low value and the result is used to control the 3 lamps on the Genius Demonstration Case: yellow for low alarm, green for no alarm, and red for high alarm.
2. The relay is activated when Analog input #1 remains high for longer than 5 seconds.
3. The Analog values for inputs 1 and 2 are each copied to the corresponding Analog outputs and thus to the two meters on the Genius demonstration case.
4. Each of the Fault switches on the Genius demonstration case can be used to create faults in the Logicmaster I/O Fault Table. (Remember the relay can not cause a fault unless it is energized.)

Chapter 5

In Case of Trouble

5.1 I/O Map

This I/O Map has been used for all standard demonstration programs. It should be used as a base for all future developments.

	%I	%Q	%AI	%AQ
0				
4	INPUT	OUTPUT	INPUT ANALOG 1-8	OUTPUT ANALOG 1-4
8	DC 32	DC 32		
12	1-32	1-32	EXPANDED INPUT ANALOG	
16				
20			9-24	
24				
28				
32				
36	HIGH SPEED COUNTER	HIGH SPEED COUNTER	HIGH SPEED COUNTER	
40				
44	33-48	33-48	33-47	
48				
52	GENIUS INPUT 49-56	GENIUS OUTPUT 49-56	GENIUS ANALOG 49-52	GENIUS ANALOG 49-50
56				
60				
64				

5.2 Series 90-70 Configuration

***** 01-25-90 16:27 GE-FANUC SERIES 90-70 DOCUMENTATION (v2.02)

DEMO70

RACK 0									
PS	1	2	3	4	5	6	7	8	9
P R O G R A M M E D C O N F I G U R A T I O N									
PWR710	CPU 782	BEM 713	PCM 711	BEM 731	MDL 653	MDL 750	ALG 230	ALG 320	
55W	16 MHZ	XMTR	PCM	GBC1	I DC 32	Q DC 32	I ALG 8	Q ALG 4	
	512 KB		512 KB	Devices	Ref Adr	Ref Adr	Ref Adr	Ref Adr	
				BUS1: 2	%I00001	%Q00001	%AI0001	%AQ0001	

SERIES 90-70 MODULE IN RACK 0 SLOT 0

SOFTWARE CONFIGURATION	
SLOT 0	Catalog #: IC697PWR710 POWER SUPPLY 120/240 VAC 55W
PWR710	
55W	

Folder: C:\LM90\FOLDERS\DEMO70

SERIES 90-70 MODULE IN RACK 0 SLOT 1

SOFTWARE CONFIGURATION	
SLOT 1	Catalog #: IC697CPU782 CPU 16 MHZ EXPANDABLE, FLOATING
CPU 771	
12 MHZ	IOScan-Stop: NO Baud Rate : 19200
512 KB	Passwords : DISABLED Parity : ODD
	Stop Bits : 1
	Data Bits : 8
	Noisy Chan : NO
	Modem TT : 0 1/100 Second / Count
	Idle Time : 10 Seconds

SERIES 90-70 MODULE IN RACK 0 SLOT 1

SOFTWARE CONFIGURATION	
SLOT 1	Catalog #: IC697MEM735 MEMORY 512 KB CMOS EXPANSION
MEM 735	
EXPMEM	
512 KB	

SERIES 90-70 MODULE IN RACK 0 SLOT 2

SOFTWARE CONFIGURATION	
SLOT 2	Catalog #: IC697BEM713 BUS TRANSMITTER
BEM 713	
XMTR	

Folder: C:\LM90\FOLDERS\DEMO70

Slot

SERIES 90-70 MODULE IN RACK 0 SLOT 3

----- SOFTWARE CONFIGURATION -----	
SLOT 3	Catalog #: IC697PCM711 PROGRAMMABLE COPROCESSOR MDL
PCM 711	
PCM	Config Mode: NONE
512 KB	

SERIES 90-70 MODULE IN RACK 0 SLOT 3

----- SOFTWARE CONFIGURATION -----	
SLOT 3	Catalog #: IC697MEM719 MEMORY 512 KB CMOS EXPANSION
MEM 719	
EXPMEM	
512 KB	

SERIES 90-70 MODULE IN RACK 0 SLOT 5

----- SOFTWARE CONFIGURATION -----	
SLOT 5	Catalog #: IC697MDL653 INPUT 24 VDC 32PT
	Ref Addr : %I00001 Size : 32
MDL 650	
I DC 32	Interrupt : DISABLED Transition : POS Inp Filter : 10MS
Ref Addr %I00001	

Folder: C:\LM90\FOLDERS\DEMO70

Slot

SERIES 90-70 MODULE IN RACK 0 SLOT 6

SOFTWARE CONFIGURATION	
SLOT 6	Catalog #: IC697MDL750 OUTPUT 24/48 VDC 0.5A 32PT Ref Addr : %Q00001 Size : 32
MDL 750	
Q DC 32	Output Def : OFF
Ref Addr %Q00001	

SERIES 90-70 MODULE IN RACK 0 SLOT 7

SOFTWARE CONFIGURATION	
SLOT 7	Catalog #: IC697ALG230 INPUT ANALOG HIGH LEVEL 8PT Ref Addr : %AI0001 Size : 8
ALG 230	
I ALG 8	<div> <div> <div>--- CHANNEL 1 ---</div> <div>Range : -10,+10V</div> <div>Fault Rep : ENABLED</div> <div>mV/uA High : +10000</div> <div>mV/uA Low : -10000</div> <div>Eng High : +32000</div> <div>Eng Low : -32000</div> <div>Alarm Int : DISABLED</div> <div>Alarm High : +32767</div> <div>Alarm Low : -32767</div> </div> <div> <div>--- CHANNEL 2 ---</div> <div>Range : -10,+10V</div> <div>Fault Rep : ENABLED</div> <div>mV/uA High : +10000</div> <div>mV/uA Low : -10000</div> <div>Eng High : +32000</div> <div>Eng Low : -32000</div> <div>Alarm Int : DISABLED</div> <div>Alarm High : +32767</div> <div>Alarm Low : -32767</div> </div> <div> <div>--- CHANNEL 3 ---</div> <div>Range : -10,+10V</div> <div>Fault Rep : ENABLED</div> <div>mV/uA High : +10000</div> <div>mV/uA Low : -10000</div> <div>Eng High : +32000</div> <div>Eng Low : -32000</div> <div>Alarm Int : DISABLED</div> <div>Alarm High : +32767</div> <div>Alarm Low : -32767</div> </div> </div>
Ref Addr %AI0001	

SERIES 90-70 MODULE IN RACK 0 SLOT 7

SOFTWARE CONFIGURATION	
SLOT 7	Catalog #: IC697ALG230 INPUT ANALOG HIGH LEVEL 8PT Ref Addr : %AI0001 Size : 8
ALG 230	
I ALG 8	<div> <div> <div>--- CHANNEL 4 ---</div> <div>Range : -10,+10V</div> <div>Fault Rep : ENABLED</div> <div>mV/uA High : +10000</div> <div>mV/uA Low : -10000</div> <div>Eng High : +32000</div> <div>Eng Low : -32000</div> <div>Alarm Int : DISABLED</div> <div>Alarm High : +32767</div> <div>Alarm Low : -32767</div> </div> <div> <div>--- CHANNEL 5 ---</div> <div>Range : -10,+10V</div> <div>Fault Rep : ENABLED</div> <div>mV/uA High : +10000</div> <div>mV/uA Low : -10000</div> <div>Eng High : +32000</div> <div>Eng Low : -32000</div> <div>Alarm Int : DISABLED</div> <div>Alarm High : +32767</div> <div>Alarm Low : -32767</div> </div> <div> <div>--- CHANNEL 6 ---</div> <div>Range : -10,+10V</div> <div>Fault Rep : ENABLED</div> <div>mV/uA High : +10000</div> <div>mV/uA Low : -10000</div> <div>Eng High : +32000</div> <div>Eng Low : -32000</div> <div>Alarm Int : DISABLED</div> <div>Alarm High : +32767</div> <div>Alarm Low : -32767</div> </div> </div>
Ref Addr %AI0001	

Folder: C:\LM90\FOLDERS\DEMO70

Slot

SERIES 90-70 MODULE IN RACK 0 SLOT 7

SOFTWARE CONFIGURATION		
SLOT 7	Catalog #: IC697ALG230 Ref Addr : %AI0001	INPUT ANALOG HIGH LEVEL 8PT Size : 8
ALG 230	-----	
	--- CHANNEL 7 ---	--- CHANNEL 8 ---
I ALG 8	Range : -10,+10V	Range : -10,+10V
	Fault Rep : ENABLED	Fault Rep : ENABLED
Ref Addr	mV/uA High : +10000	mV/uA High : +10000
%AI0001	mV/uA Low : -10000	mV/uA Low : -10000
	Eng High : +32000	Eng High : +32000
	Eng Low : -32000	Eng Low : -32000
	Alarm Int : DISABLED	Alarm Int : DISABLED
	Alarm High : +32767	Alarm High : +32767
	Alarm Low : -32767	Alarm Low : -32767

SERIES 90-70 MODULE IN RACK 0 SLOT 8

SOFTWARE CONFIGURATION			
SLOT	Catalog #:	OUTPUT ANALOG_VOLT/CURRENT 4PT	
8	Ref Addr : %AQ0001	Size : 4	

ALG 320	-----		
	--- CHANNEL 1 ---	--- CHANNEL 2 ---	--- CHANNEL 3 ---
Q ALG 4	Range : -10,+10V	Range : -10,+10V	Range : -10,+10V
	Fault Rep : ENABLED	Fault Rep : ENABLED	Fault Rep : ENABLED
Ref Addr	Output Def : OFF	Output Def : OFF	Output Def : OFF
%AQ0001	Default Val: +00000	Default Val: +00000	Default Val: +00000
	mV/uA High : +10000	mV/uA High : +10000	mV/uA High : +10000
	mV/uA Low : -10000	mV/uA Low : -10000	mV/uA Low : -10000
	Eng High : +32000	Eng High : +32000	Eng High : +32000
	Eng Low : -32000	Eng Low : -32000	Eng Low : -32000

SERIES 90-70 MODULE IN RACK 0 SLOT 8

SOFTWARE CONFIGURATION		
SLOT 8	Catalog #: IC697ALG320 Ref Addr : %AQ0001	OUTPUT ANALOG_VOLT/CURRENT 4PT Size : 4
ALG 320	-----	
	--- CHANNEL 4 ---	
Q ALG 4	Range : -10,+10V	
	Fault Rep : ENABLED	
Ref Addr	Output Def : OFF	
%AQ0001	Default Val: +00000	
	mV/uA High : +10000	
	mV/uA Low : -10000	
	Eng High : +32000	
	Eng Low : -32000	

Rack 0 Slot 4 ----- Bus 1 ---							
BUS ADR 0	BUS ADR 1	BUS ADR 2	BUS ADR 3	BUS ADR 4	BUS ADR 5	BUS ADR 6	BUS ADR 7
	BBD 101	BBA 100					
	QI AC 8	4AI/2AQ					
	Ref ADR QI00049	Ref ADR AQI0049					

There are no GENIUS blocks configured in the Bus Address range 8..15

Rack 0 Slot 4 ----- Bus 1 ---							
BUS ADR 16	BUS ADR 17	BUS ADR 18	BUS ADR 19	BUS ADR 20	BUS ADR 21	BUS ADR 22	BUS ADR 23
		BEM 731					
		GBC1					
		Devices BUS1: 2					

There are no GENIUS blocks configured in the Bus Address range 24..31

RACK 0 SLOT 4--- BUS 1	
----- SOFTWARE CONFIGURATION -----	
BUS ADR 1	Catalog #: IC660BBD101 Ref Addr : %QI00049 I/O BLK 115 VAC 8CKT PH B Size : 8
BBD 100	-----
QI AC 8	Input Def : OFF Out Enable : YES
Ref Addr QI00049	

RACK 0 SLOT 4--- BUS 1	
----- SOFTWARE CONFIGURATION -----	
BUS ADR 2	Catalog #: IC660BBA100 Ref Addr : %AQI0049 I/O BLK ANALOG 4IN/2OUT AC PHB Size : 4
BBA 100	-----
4AI/2AQ	Out Enable : YES
Ref Addr AQI0049	

RACK 0 SLOT 4--- BUS 1	
----- SOFTWARE CONFIGURATION -----	
BUS ADR 18	Catalog #: IC697BEM731 GENIUS BUS CONTROLLER (1CHAN)
BEM 731	-----
GBC1	Bus #1 Addr: 18 Baud Rate : 153K STD Error Rate : 0 ----- SEND GLOBAL DATA ----- Config Mode: MANUAL From Addr : %Q00001 Data length: 16 To (Opt.) : 0

Folder: C:\LM90\FOLDERS\DEMO70	
Rack	

-----			DISCRETE INPUTS		(%I) -----
TOTAL I+Q:	88				HIGHEST REF CONFIGURED: 56
REFERENCE	PHYSICAL		IO	MODULE	
START - END	ADDRESS		TYPE	TYPE	DESCRIPTION

00001-00032	0.5		90-70	I DC 32	INPUT 24 VDC 32PT
00049-00056	0.4.1.01		GENIUS	QI AC 8	I/O BLK 115 VAC 8CKT PH B

-----			DISCRETE OUTPUTS		(%O) -----
TOTAL I+Q:	88				HIGHEST REF CONFIGURED: 56
REFERENCE	PHYSICAL		IO	MODULE	
START - END	ADDRESS		TYPE	TYPE	DESCRIPTION

00001-00016	0.4.1.18		GENIUS	GBC1	GENIUS BUS CONTROLLER (1CHAN)
00001-00032	0.6		90-70	Q DC 32	OUTPUT 24/48 VDC 0.5A 32PT
00049-00056	0.4.1.01		GENIUS	QI AC 8	I/O BLK 115 VAC 8CKT PH B

-----			ANALOG INPUTS		(%AI) -----
TOTAL USED:	12				HIGHEST REF CONFIGURED: 52
REFERENCE	PHYSICAL		IO	MODULE	
START - END	ADDRESS		TYPE	TYPE	DESCRIPTION

00001-00008	0.7		90-70	I ALG 8	INPUT ANALOG HIGH LEVEL 8PT
00049-00052	0.4.1.02		GENIUS	4AI/2AQ	I/O BLK ANALOG 4IN/2OUT AC PHB

-----			ANALOG OUTPUTS		(%AQ) -----
TOTAL USED:	8				HIGHEST REF CONFIGURED: 52
REFERENCE	PHYSICAL		IO	MODULE	
START - END	ADDRESS		TYPE	TYPE	DESCRIPTION

00001-00004	0.8		90-70	Q ALG 4	OUTPUT ANALOG VOLT/CURRENT 4PT
00049-00052	0.4.1.02		GENIUS	4AI/2AQ	I/O BLK ANALOG 4IN/2OUT AC PHB

-----			REGISTER MEMORY		(%R) -----
TOTAL USED:	0				HIGHEST REF CONFIGURED: 0
REFERENCE	PHYSICAL		IO	MODULE	
START - END	ADDRESS		TYPE	TYPE	DESCRIPTION

No Entries for this Reference Type

Folder: C:\LM90\FOLDERS\DEMO70

Ref View

CPU MEMORY CONFIGURATION FOR MODEL 771 CPU:

Discrete Input	(%I)	2048	Bytes
Discrete Output	(%Q)	2048	By-
		tes	
Internal Discrete	(%M)	4096	By-
		tes	
System Use	(%S)	512	Bytes
Temporary Status	(%T)	256	By-
		tes	

TOTAL DISCRETE MEMORY:

8960 Bytes

Analog Input	(%AI)	64	Wor
		ds	
Analog Output	(%AQ)	64	Wor
		ds	
Register Memory	(%R)	1024	Wor
		ds	

TOTAL LOGIC MEMORY

521344 Bytes

CPU MEMORY TOTAL

524288 Bytes

POINT FAULT REFERENCE**ENABLED****FAULT CATEGORY CONFIGURATION:**

Loss of or Missing Rack	D
Loss of or Missing IOC	D
Loss of or Missing I/O Module	D
Loss of or Missing Option Module	D
System Bus Failure	F
IOC Fault (I/O Bus Fault)	F
System Config Mismatch	D

5.3 Genius Demonstration Case Configuration

DISCRETE BLOCK

Baud Rate	153.6K ST							
Block Number	1							
Circuit References	49 to 56 (Don't care)							
Block Type	OI							
Configuration Protect	Disabled							
Pulse Test	Enabled							
Input Filter Time	50 ms							
Circuit Configuration	1	2	3	4	5	6	7	8
	IT		OI			OI		OI
	OI		I			I		I
Report Fault	Yes							
Hold Last State	No							
Output Default	Off							
Report No Load	1		2			3		4
	5		6			7		8
	X		Y			N		N
	N		X			X		X
Overload Shutdown*	Yes							
BSM Present	No							
CPU Redundancy	No							

ANALOG BLOCK

Baud Rate	153.6K ST			
Block Number	2			
Circuit References	49 to 54 (Don't care)			
Configuration Protect	Disabled			
Report Fault	1	2	3	4
	5	6		
	Y	Y	N	N
	Y	Y		
Current/Voltage Range	Input Channels 1&2 4–20ma			
	Output Channels –10 to +10			
Scaling Points	Inputs +/-10,000 Eng. Units			
	Inputs 0 / 4,095 Raw Counts			
	Outputs +/-10,000 Eng. Units			
	Outputs +/-10,000 Raw Counts			
Input Filter Time	128ms			
High/Low Alarms	+/-10,000			
Alarm Input Mode	No			
Hold Last State	No			
Output Default	0			
BSM Present	No			
CPU Redundancy	No			

Caution

***DO NOT DISABLE THE OVERLOAD SHUTDOWN. The temperature sensors for the Genius blocks are disabled. Excessive heat may build up in the demonstration case if an overload condition exists for an extended period of time.**

5.4 PCM Configuration

EDIT MEGABASIC CONFIGURATION DATA

Enable Megabasic:	YES
Start MB on Soft Reset:	YES
Program to Run at Reset:	RAM:BASIC.PGM
User Program I/O	Input: NULL
	Output: NULL
	Error: COM1
Interpreter Ver to Use:	DEV
Priority:	6
MegaBasic Command Line:	blank
Allocated Data Size:	90

EDIT SERIAL PORT 1 (COM1:)

Interface:	RS232
Data Rate:	19200
Parity:	NONE
Flow Control:	SOFTWARE
Stop Bits:	1
Bits/Char:	8

EDIT SERIAL PORT 2 (COM2:)

This Data is IGNORED because CCM is Enabled on This Port.

EDIT CCM CONFIGURATION DATA FOR PORT 1

Enable CCM on Port:	NO
---------------------	----

EDIT CCM CONFIGURATION DATA FOR PORT 2

Enable CCM on Port:	YES
CCM CPU ID:	1
Mode:	MASTER
Turnaround Delay:	100ms
Timeout:	LONG
Retry Count:	NORMAL
Interface:	RS485
Data Rate:	9600 bps
Parity:	NONE
Flow Control:	NONE
Priority:	5

All other settings are set to the Default values.

5.5 Program Files

A 3.5 inch disk is included with each Series 90-70 demonstration case that includes the following directories:

DEMO70	Logicmaster files with the demonstration ladder.
TEST70	Logicmaster files used to test the cables between the Series 90-70 demonstration case and the Universal Simulator.
PCM	MegaBasic files for the PCM. The .TXT files in PCM70 can be used for a listing of the programs. The files that are loaded on the PCM are in DEM70.PCM: BASIC.PGM S90_DEMO.CRN FEATUR30.CRN FEATUR70.CRN LM90TU.CRN SYSDemo.CRN MANUFACT.CRN PROCESS.CRN MAT_HAND.CRN FLTTBL.CRN GRAPH1.CRN VT100_5.CRN UCDF.CDF Configuration

5.6 Cable Diagrams

DISPLAY

25 Pin Female	25 Pin Male
2 -----	3
3 -----	2
4 -----	5
5 -----	4
7 shield	shield 7

ENCODER

9 Pin Male	High Speed Counter
1 -----	Channel A
2 -----	Channel B
7 shield	

METER

9 Pin Female	Analog Output
3 -----	3
5 -----	5
7 shield	

POTS

9 Pin Male	Analog Input
3 -----	3
5 -----	5
7 shield	
4 -----	4

6 ----- 6
8 shield

INPUT

37 Pin Male	24V Input
1 thru 8 -----	2 thru 9
9 thru 16 -----	12 thru 19
17 thru 24 -----	22 thru 29
25 thru 32 -----	32 thru 39
35 -----	40,30,20,10

OUTPUT

37 Pin Male	24V Output
1 thru 8 -----	2 thru 9
9 thru 16 -----	12 thru 19
17 thru 24 -----	22 thru 29
25 thru 32 -----	32 thru 39
33 -----	31,21,11,01
36 -----	40,30,20,10